Meade Telescope Serial Command Protocol

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Introduction

This paper documents the Meade Telescope Serial Control Protocol utilized to remotely command and control Meade Telescopes. This command language contains a core of common commands supported by all telescopes. Due to different implementation and technological advances the command has extension that are not supported by all model. The differences are noted in the descriptive text for the commands. Finally, there are a series of new commands proposed for the Autostar II. These commands are indicated in the Appendix A at the end of this document.

Telescope Command Groupings:

		Supported			
Command Group	Command Designator Symbol	AutoStar	LX200<16"	LX 16"	AutoStar II
Alignment Query	<ACK>	x	x	x	x
Alignment*	A	x	x	x	x
Active Backlash	$B	-	-	-	x
Reticule Control*	B	x	p	p	x
Sync Control	C	p	p	p	x
Distance Bars	D	x	x	x	x
Fan*	f	-	-	p	x
Focus Control Commands	F	p	p	p	x
GPS Commands	g	-	-	-	x
Get Information	G	x	x	x	x
Home Position Commands*	h	x	-	x	x
Hour	H	x	x	x	x
Initialize Telescope	I	-	-	-	x
Library	L	p	p	p	x
Movement	M	x	p	x	x
High Precision	P	x	x	x	x
Smart Drive Control*	$Q	x	x	x	x
Quit Command	Q	x	x	x	x
Field De-rotator	r	-	-	p	x
Rate Control	R	p	p	p	x
Set Information	S	x	x	x	x
Tracking Frequency	T	p	p	p	x
User Format Control	U	p	x	x	x
Way point (Site)	W	x	x	x	x
Help Commands	?	-	x	x	-

Notes:

Commands accepted by the telescopes are shown in the table above indicated by an x entry. This means that the telescope will accept these commands and respond with a syntactically valid response where required. A "p" indicated only a subset of this command class is supported. Due to the differing implementations of the telescopes, some of the commands may provide static responses or may do nothing in response to the command. See the detailed description of the commands below to determine the exact behavior.

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ACK - Alignment Query

ACK <0x06> Query of alignment mounting mode.
Returns:
A If scope in AltAz Mode
D If scope is currently in the Downloader [Autostar II & Autostar]
L If scope in Land Mode
P If scope in Polar Mode

EOT – Firmware Download Request

EOT <0x04> Enter the Meade firmware downloader.
Autostar & Autostar II - This command is a propriety entrance to the firmware downloader. Details of its operation are contained in Meade internal documents. The existence of this code should not be disclosed outside of the company.
LX200 – Unsupported

A - Alignment Commands

:Aa# Start Telescope Automatic Alignment Sequence [Autostar II/RCX400 only]
Returns:
1: When complete (can take several minutes).
0: If scope not AzEl Mounted or align fails

:AL# Sets telescope to Land alignment mode
Returns: nothing

:AP# Sets telescope to Polar alignment mode
Returns: nothing

:AA# Sets telescope the AltAz alignment mode
Returns: nothing

$B – Active Backlash Compensation

:$BAdd#
Set Altitude/Dec Antibacklash
Returns Nothing

:$BZdd#
Set Azimuth/RA Antibacklash
Returns Nothing

B - Reticule/Accessory Control

:B+# Increase reticule Brightness
Return: Nothing

:B-# Decrease Reticule Brightness
Return: Nothing

:B<n># Set Reticle flash rate to <n> (an ASCII expressed number)
<n> Values of 0..3 for LX200 series
<n> Values of 0..9 for Autostar and Autostar II/RCX400
Return: Nothing

:BDn# Set Reticule Duty flash duty cycle to <n> (an ASCII expressed digit) [LX200 GPS Only]
<n> Values: 0 = On, 1..15 flash rate
Return: Nothing

C - Sync Control

:CL# [Autostar II Only] Synchonize the telescope with the current Selenographic coordinates.

:CM# Synchronizes the telescope's position with the currently selected database object's coordinates.
Returns:
LX200's - a "#" terminated string with the name of the object that was synced.
Autostars & Autostar II - At static string: " M31 EX GAL MAG 3.5 SZ178.0'#"

D - Distnace Bars

:D# Requests a string of bars indicating the distance to the current target location.
Returns:
LX200's – a string of bar characters indicating the distance.
Autostars and Autostar II – a string containing one bar until a slew is complete, then a null string is returned.

f - Fan/Heater Commands

:f+# LX 16"– Turn on the tube exhaust fan
Max/RCX – Turn on tube exhaust fan
Autostar II – Turn on power to accessory panel
Autostar & LX200 < 16" – Not Supported
Returns: nothing

:f-# LX 16"– Turn off tube exhaust fan
Max/RCX – Turn off tube exhaust fan
Autostar II - Turn off power to accessory panel
Autostar & LX200 < 16" – Not Supported
Returns: Nothing

:fH<ddd>#
Max/RCX – Sets corrector plate heater level, where <ddd> is a level from 0…100 percent duty cycle.
All others – Not supported
Returns - Nothing

:fp+# Max/RCX – Turn on switched 12V panel power
All others – Not Supported
Returns: Nothing

:fp-# Max/RCX – Turn off switched 12V panel power
All others – Not Supported
Returns: Nothing

:fT# Autostar II – Return Optical Tube Assembly Temperature
Max/RCX – Return OTA Temperature
Returns <sdd.ddd># - a '#' terminated signed ASCII real number indicating the Celsius ambient temperature.
All others – Not supported

:fC# Max/RCX – Return Corrector Plate Temperature
Returns <sdd.ddd># - a '#' terminated signed ASCII real number indicating the Celsius ambient temperature.
All others – Not supported

F – Focuser Control

:F+# Start Focuser moving inward (toward objective)
Returns: None

:F-# Start Focuser moving outward (away from objective)
Returns: None

:FB# Max/RCX400 – Query Focuser Busy Status
All others – Not supported
Returns 0 if focuser is idle

1 if focuser is moving

:FC<n/s/e/w> #
TBD-Max/RCX- collimate command. Starts the corrector plate tilting in the specified direction. Use :FQ# to halt movement
All others – Not supported
Returns nothing

:FLD<n>#
Max/RCX – Define current position as focuer preset <n> (1..9).
All others – unsupported
Returns – Nothing

:FLN<n><name>#
Max/RCX - Assign focuser preset <n>(1..9) the <name> specificed.
All others – Unspported
Returns - Nothing

:FLS<n>#
Max/RCX – Sync focuser to preset position <n>(1..9).
All others - unsupported
Returns - Nothing

:FPsDDDDD.DDDD#
Autostar II – Pulse Focuser for the number of milliseconds specified in the signed number sDDDD. The range is limited to –65000 .0to +65000.0 Positive moves the focuser inward, negative moves the focuser outward.
Max/RCX – Move focuser to the position indicated by the decimal argument. The value should be express in decimal millimenters. The :FB# command should be used to poll for the completion of this operation.
All others – Not supported
Returns: Nothing

:Fp# Max/RCX – Query digital focuser position.
Returns a '#' terminated ASCII integer which is the current focuser position.
All others – Not Supported

:FQ# Halt Focuser Motion
Returns: Nothing

:FF# Set Focus speed to fastest setting
Returns: Nothing

:FS# Set Focus speed to slowest setting
Returns: Nothing

:F<n># Autostar, Autostar II – set focuser speed to <n> where <n> is an ASCII digit 1..4
Returns: Nothing
All others – Not Supported

g – GPS/Magnetometer commands

:g+# Autostar II Only - Turn on GPS
Returns: Nothing

:g-# Autostar II Only - Turn off GPS

:gps# Autostar II Only – Turns on NMEA GPS data stream.
Returns: The next string from the GPS in standard NEMA format followed by a '#' key

:gT# Powers up the GPS and updates the system time from the GPS stream. The process my take several minutes to complete. During GPS update, normal handbox operations are interrupted. [Autostar II only]
Returns: '0' In the event that the user interrupts the process, or the GPS times out.
Returns: '1' After successful updates

G – Get Telescope Information

:G0# Get Alignment Menu Entry 0
Returns: A '#' Terminated ASCII string. [LX200 legacy command]

:G1# Get Alignment Menu Entry 0
Returns: A '#' Terminated ASCII string. [LX200 legacy command]

:G2# Get Alignment Menu Entry 0
Returns: A '#' Terminated ASCII string. [LX200 legacy command]

:Ga# Get Local Telescope Time In 12 Hour Format
Returns: HH:MM:SS#
The time in 12 format

:GA# Get Telescope Altitude
Returns: sDD*MM# or sDD*MM'SS#
The current scope altitude. The returned format depending on the current precision setting.

:Gb# Get Browse Brighter Magnitude Limit
Returns: sMM.M#
The magnitude of the faintest object to be returned from the telescope FIND/BROWSE command.
Command when searching for objects in the Deep Sky database.

:GC# Get current date.
Returns: MM/DD/YY#
The current local calendar date for the telescope.

:Gc# Get Clock Format
Returns: 12# or 24#
Depending on the current telescope format setting.

:GD# Get Telescope Declination.
Returns: sDD*MM# or sDD*MM'SS#
Depending upon the current precision setting for the telescope.

:Gd# Get Currently Selected Object/Target Declination
Returns: sDD*MM# or sDD*MM'SS#
Depending upon the current precision setting for the telescope.

:GE# Get Selenographic Latitude
LX200gps/RCX Only
Returns: sDD*MM#
The selenographic Position of the telescope. If the scope is not presently pointed to the Moon the scope will return +99*99#

:Ge# Get Selenographic Longitude
LX200gps/RCX Only
Returns: sDDD*MM#
The selenogrphic position of the telescope. West Longitude is shown as negative. If the scope is not pointed at the Moon +999*99# will be returned.

:GF# Get Find Field Diameter
Returns: NNN#

An ASCII integer expressing the diameter of the field search used in the IDENTIFY/FIND commands.

:Gf# Get Browse Faint Magnitude Limit
Returns: sMM.M#
The magnitude or the brightest object to be returned from the telescope FIND/BROWSE command.

:GG# Get UTC offset time
Returns: sHH# or sHH.H#
The number of decimal hours to add to local time to convert it to UTC. If the number is a whole number the sHH# form is returned, otherwise the longer form is returned.

:Gg# Get Current Site Longitude
Returns: sDDD*MM#
The current site Longitude. East Longitudes are expressed as negative

:GH# Get Daylight Savings Time Setting [Autostar II only]
Returns:
1# if daylight savings is enabled.
0# if daylight savings time is disabled.

:Gh# Get High Limit
Returns: sDD*
The highest mount relative altitude (to keep cameras etc. from crashing into forks or tripods) that the telescope will be allowed to slew to without a warning message.

:GL# Get Local Time in 24 hour format
Returns: HH:MM:SS#
The Local Time in 24-hour Format

:Gm# Get distance to Meridian [Max Only]
Returns: sDD*MM'SS# or sDD*MM depending on precision setting.
A '#' terminated string is the RA angle to the Meridian (LST-RA). If the scope is on a German mount, a negative sign indicates the scope has moved to the offside of the mount where interference is possible. On fork mounts, the value is always positive.

:Gl# Get Larger Size Limit
Returns: NNN'#
The size of the smallest object to be returned by a search of the telescope using the BROWSE/FIND commands.

:Gm# Get distance to Meridian [Max Only]
Returns: sDD*MM'SS# or sDD*MM # depending on the current precision setting.
A '#' terminated string is the RA distance to the Meridian (LST-RA). If the scope is on a German mount, a negative sign indicates the scope has moved to the offside of the mount where interference is possible. On fork mounts, the value is always positive.

:GM# Get Site 1 Name
Returns: <string>#
A '#' terminated string with the name of the requested site.

:GN# Get Site 2 Name
Returns: <string>#
A '#' terminated string with the name of the requested site.

:GO# Get Site 3 Name
Returns: <string>#
A '#' terminated string with the name of the requested site.

:GP# Get Site 4 Name

Returns: <string>#
A '#' terminated string with the name of the requested site.

:GpB# Get backlash values [Autostar and Autostar II]
Returns: <num> <space><num>#

: GpH# Get Home Data [Autostar II only]
Returns: <num><num>#
The scope's home position

:GpS# Get Sensor Offsets [Autostar II only]
Returns: <num><num><num>#
These are the azerror,elerror and home position offset

:Go# Get Lower Limit
Returns: DD*#
The minimum elevation of an object above the horizon to which the telescope will slew with reporting a "Below Horizon" error.

:Gq# Get Minimum Quality For Find Operation
Returns:

SU#	Super
EX#	Excellent
VG#	Very Good
GD#	Good
FR#	Fair
PR#	Poor
VP#	Very Poor

The mimum quality of object returned by the FIND command.

:GR# Get Telescope RA
Returns: HH:MM.T# or HH:MM:SS#
Depending which precision is set for the telescope

:Gr# Get current/target object RA
Returns: HH:MM.T# or HH:MM:SS
Depending upon which precision is set for the telescope

:GS# Get the Sidereal Time
Returns: HH:MM:SS#
The Sidereal Time as an ASCII Sexidecimal value in 24 hour format

:Gs# Get Smaller Size Limit
Returns: NNN'#
The size of the largest object returned by the FIND command expressed in arcminutes.

:GT# Get tracking rate
Returns: TT.T#
Current Track Frequency expressed in hertz assuming a synchonous motor design where a 60.0 Hz motor clock would produce 1 revolution of the telescope in 24 hours.

:Gt# Get Current Site Latitude
Returns: sDD*MM#
The latitude of the current site. Positive inplies North latitude.

:GVD# Get Telescope Firmware Date
Returns: mmm dd yyyy#

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:GVN# Get Telescope Firmware Number
Returns: dd.d#

:GVO# Get OTA Focuser Type
Returns:
<n>#
where:
n=0 for LX200 type motor focusers
n=1 for RCX OTA digital focusers
n=2… reserved for future use

:GVP# Get Telescope Product Name
Returns: <string>#

:GVT# Get Telescope Firmware Time
returns: HH:MM:SS#

:GW# Get Scope Alignment Status
Returns:
<mount><tracking><alignment>#
where:
mount: A-AzEl mounted, P-Equatorially mounted, G-german mounted equatorial
tracking: T-tracking, N-not tracking
alignment: 0-needs alignment, 1-one star aligned, 2-two star aligned, 3-three star aligned.

:Gy# Get deepsky object search string
Returns: GPDCO#
A string indicaing the class of objects that should be returned by the FIND/BROWSE command. If the character is upper case, the object class is return. If the character is lowercase, objects of this class are ignored. The character meanings are as follws:
G – Galaxies
P – Planetary Nebulas
D – Diffuse Nebulas
C – Globular Clusters
O – Open Clusters

:GZ# Get telescope azimuth
Returns: DDD*MM#T or DDD*MM'SS#
The current telescope Azimuth depending on the selected precision.

h – Home Position Commands

:hC# Autostar II Only - Calibrate Home Position. This command causes a previously aligned telescope to seek the default home position, and remember its alignment relative to that home position. This command allows telescopes left in arbitrary positions to recover alignment using the :hF# command. Progress of this command can be checked with the :h?# command.

:hF# Autostar, Autostar II and LX 16" Seeks the Home Position of the scope and sets/aligns the scope based on the encoder values stored in non-volatile memory
Returns: Nothing

:hIYYMMDDHHMMSS#
Bypass handbox entry of daylight savings, date and time. Use the values supplied in this command. This feature is intended to allow use of the Autostar II from permanent installations where GPS reception is not possible, such as within metal domes. This command must be issued while the telescope is waiting at the initial daylight savings prompt.
Returns: 1 – if command was accepted.

:hN# Autostar II only: Sleep Telescope. Power off motors, encoders, displays and lights. Scope remains in minimum power mode until a keystroke is received or a wake command is sent.

:hP# Autostar, Autostar II and LX 16"Slew to Park Position
Returns: Nothing

:hS# Autostar II and LX 16" – Sets the current scope position as the park position of the telescope. Subsequent to this command, a :hP# command will drive the scope to this mount relative position.
Returns: Nothing
LX200 – Ignored

:hW# Autostar II Only: Wake up sleeping telescope.

:h?# Autostar, Autostar II and LX 16" Query Home Status
Returns:
0 Home Search Failed
1 Home Search Found
2 Home Search in Progress
LX200 Not Supported

H – Time Format Command
:H# Toggle Between 24 and 12 hour time format
Returns: Nothing

I – Initialize Telescope Command
:I# LX200 GPS Only - Causes the telescope to cease current operations and restart at its power on initialization.

L – Object Library Commands
:LB# Find previous object and set it as the current target object.
Returns: Nothing
Autostar II & Autostar – Performs no function

:LCNNNN#
Set current target object to deep sky catalog object number NNNN
Returns : Nothing
Autostar II & Autostar – Implemented in later firmware revisions

:LF# Find Object using the current Size, Type, Upper limit, lower limt and Quality contraints and set it as current target object.
Returns: Nothing
Autostar II & Autostar – Performs no function

:Lf# Identify object in current field.
Returns: <string>#
Where the string contains the number of objects in field & object in center field.
Autostar II & Autostar – Performs no function. Returns static string "0 - Objects found".

:LI# Get Object Information
Returns: <string>#
Returns a string containing the current target object's name and object type.
Autostar II & Autostar – performs no operation. Returns static description of Andromeda Galaxy.

:LMNNNN#
Set current target object to Messier Object NNNN, an ASCII expressed decimal number.
Returns: Nothing.
Autostar II and Autostar – Implemented in later versions.

:LN# Find next deep sky target object subject to the current constraints.
Autostar II & AutoStar – Performs no function

:LoD# Select deep sky Library where D specifies

0 - Objects CNGC / NGC in Autostar & Autostar II
1 - Objects IC
2 – UGC
3 – Caldwell (Autostar & Autostar II)
4 – Arp (LX200GPS/RCX)
5 – Abell (LX200GPS/RCX)

Returns:
1 Catalog available
0 Catalog Not found

Autostar II & AutoStar – Performs no function always returns "1"

:LsD# Select star catalog D, an ASCII integer where D specifies:
0 STAR library (Not supported on Autostar I & II)
1 SAO library
2 GCVS library
3 Hipparcos (Autostar I & 2)
4 HR (Autostar I & 2)
5 HD (Autostar I & 2)

Returns:
1 Catalog Available
2 Catalog Not Found

:LSNNNN#
Select star NNNN as the current target object from the currently selected catalog
Returns: Nothing
Autostar II & AutoStar – Available in later firmwares

M – Telescope Movement Commands

:MA# Autostar, LX 16", Autostar II – Slew to target Alt and Az
Returns:
0 - No fault
1 – Fault
LX200 – Not supported

:MgnDDDD#
:MgsDDDD#
:MgeDDDD#
:MgwDDDD#
Guide telescope in the commanded direction (nsew) for the number of milliseconds indicated by the unsigned number passed in the command. These commands support serial port driven guiding.
Returns – Nothing
LX200 – Not Supported

:MgS<x>#
StarLock enable or disable. When <x> is '1', StarLock autoguiding is enabled. HPP pointing, if enabled will employ the StarLock. When <x> is '0', StarLock guiding and high precision pointing are disabled.
Returns – Nothing
LX200 – Not Supported.

:Me# Move Telescope East at current slew rate
Returns: Nothing

:Mn# Move Telescope North at current slew rate
Returns: Nothing

:Ms# Move Telescope South at current slew rate
Returns: Nothing

:Mw# Move Telescope West at current slew rate
Returns: Nothing

:MS# Slew to Target Object
Returns:

0	Slew is Possible
1<string>#	Object Below Horizon w/string message
2<string>#	Object Below Higher w/string message

P - High Precision Toggle

:P# Toggles High Precsion Pointing. When High precision pointing is enabled scope will first allow the operator to center a nearby bright star before moving to the actual taget.
Returns: <string>

"HIGH PRECISION"	Current setting after this command.
"LOW PRECISION"	Current setting after this command.

$Q – Smart Drive Control

$Q# Toggles Smart Drive PEC on and off for both axis
Returns: Nothing
Not supported on Autostar

:$QA+# Enable Dec/Alt PEC [Autostar II only]
Returns: Nothing

:$QA-# Disable Dec/Alt PEC [Autostar II only]
Returns: Nothing

:$QC# [Autostar II only]
Query number of points in the smart model.
Returns: NNNNN#
The number of points in the Smart Mount Model

:$QGNNNNN# [Autostar II only]
Read Smart Mount Model point NNNNN.
Returns: <n><n>#
A pair of Ascii expressed numbers separated by a blank and terminated with the '#'

:$QP<p><n><n># [Autostar II only]
Sets the smart mount model point <p> to <n> <n>. All numbers are blank terminated and ascii expressed.
Returns: Nothing

:$QS+# Enables SmartMount[Autostar II only]
Returns: Nothing

:$QS-# Disables SmartMount[Autostar II only]
Returns: Nothing

:$QU+# Enables SmartMount Update Mode[Autostar II only]
Returns: Nothing

:$QU-# Disables SmartMount Update Mode[Autostar II only]
Returns: Nothing

:$QV+# Enable Text To Speech output [Autostar II only]
Returns: Nothing

:$QV-# Disables Text-To-Speech output[Autostar II only]

Returns: Nothing

:$QW# [Autostar II only]
Write Smart mount model to non-volatile memory.
Returns: 1 – ok
0 – If a write fault occurs.

:$QZ+# Enable RA/AZ PEC compensation [Autostar II only]
Returns: Nothing

:$QZ-# Disable RA/AZ PEC Compensation [LX200gpgs only]
Return: Nothing

Q – Movement Commands

:Q# Halt all current slewing
Returns:Nothing

:Qe# Halt eastward Slews
Returns: Nothing

:Qn# Halt northward Slews
Returns: Nothing

:Qs# Halt southward Slews
Returns: Nothing

:Qw# Halt westward Slews
Returns: Nothing

r – Field Derotator Commands

:r+# Turn on Field Derotator [LX 16" and Autostar II]
Returns: Nothing

:r-# Turn off Field Derotator, halt slew in progress. [Lx 16" and Autostar II]
Returns Nothing

:rn# Orient Field rotator to North Up position. [Autostar II only]
Returns Nothing

:rh# Mark current position as North Up for future reference. [Autostar II only]
Return: Nothing

:rC# Start fast slew field rotator clockwise [Autostar II only]
Returns: Nothing

:rc# Start fast slew fiedl rotator counter clockwise. [Autostar II only]
Returns: Nothing

:rq# Halt field derotator slew. [Autostar II only]
Returns: Nothing

R – Slew Rate Commands

:RC# Set Slew rate to Centering rate (2nd slowest)
Returns: Nothing

:RG# Set Slew rate to Guiding Rate (slowest)
Returns: Nothing

:RM# Set Slew rate to Find Rate (2nd Fastest)
Returns: Nothing

:RS# Set Slew rate to max (fastest)
Returns: Nothing

:RADD.D#
Set RA/Azimuth Slew rate to DD.D degrees per second [Autostar II Only]
Returns: Nothing

:REDD.D#
Set Dec/Elevation Slew rate to DD.D degrees per second [Autostar II only]
Returns: Nothing

:RgSS.S#
Set guide rate to +/- SS.S to arc seconds per second. This rate is added to or subtracted from the current tracking Rates when the CCD guider or handbox guider buttons are pressed when the guide rate is selected. Rate shall not exceed sidereal speed (approx 15.0417"/sec)[Autostar II only]
Returns: Nothing

S – Telescope Set Commands

:SasDD*MM#
Set target object altitude to sDD*MM# or sDD*MM'SS# [LX 16", Autostar, Autostar II]
Returns:
1 Object within slew range
0 Object out of slew range

:SbsMM.M#
Set Brighter limit to the ASCII decimal magnitude string. SMM.M
Returns:
0 - Valid
1 – invalid number

:SBn# Set Baud Rate n, where n is an ASCII digit (1..9) with the following interpertation
1 56.7K
2 38.4K
3 28.8K
4 19.2K
5 14.4K
6 9600
7 4800
8 2400
9 1200
Returns:
1 At the current baud rate and then changes to the new rate for further communication

:SCMM/DD/YY#
Change Handbox Date to MM/DD/YY
Returns: <D><string>
D = '0' if the date is invalid. The string is the null string.
D = '1' for valid dates and the string is "Updating Planetary Data# #"
Note: For Autostar II this is the UTC data!

:SdsDD*MM#
Set target object declination to sDD*MM or sDD*MM:SS depending on the current precision setting
Returns:

1 - Dec Accepted
0 – Dec invalid

:SEsDD*MM#
Sets target object to the specificed selenographic latitude on the Moon.
Returns 1- If moon is up and coordinates are accepted.
0 – If the coordinates are invalid

:SesDDD*MM#
Sets the target object to the specified selenogrphic longitude on the Moon
Returns 1 – If the Moon is up and coordinates are accepted.
0 – If the coordinates are invalid for any reason.

:SfsMM.M#
Set faint magnitude limit to sMM.M
Returns:
0 – Invalid
1 - Valid

:SFNNN#
Set FIELD/IDENTIFY field diameter to NNN arc minutes.
Returns:
0 – Invalid
1 - Valid

:SgDDD*MM#
Set current site's longitude to DDD*MM an ASCII position string
Returns:
0 – Invalid
1 - Valid

:SGsHH.H#
Set the number of hours added to local time to yield UTC
Returns:
0 – Invalid
1 - Valid

:SHD#
Set daylight savings time parameter. [Autostar II only]. Where D = 1 enables daylight savings and D = 0 disables daylight savings.

:ShDD#
Set the maximum object elevation limit to DD#
Returns:
0 – Invalid
1 - Valid

:SlNNN#
Set the size of the smallest object returned by FIND/BROWSE to NNNN arc minutes
Returns:
0 – Invalid
1 - Valid

:SLHH:MM:SS#
Set the local Time
Returns:
0 – Invalid
1 - Valid

:Sm+# Enable smart mount flexure correction [Autostar II only]
Returns: nothing

:Sm-# Disable smart mount flexure correction [Autostar II only]
Returns: nothing

:SM<string>#
Set site 1's name to be <string>. LX200s only accept 3 character strings. Other scopes accept up to 15 characters.
Returns:
0 – Invalid
1 - Valid

:SN<string>#
Set site 2's name to be <string>. LX200s only accept 3 character strings. Other scopes accept up to 15 characters.
Returns:
0 – Invalid
1 - Valid

:SO<string>#
Set site 3's name to be <string>. LX200s only accept 3 character strings. Other scopes accept up to 15 characters.
Returns:
0 – Invalid
1 - Valid

:SoDD*#
Set lowest elevation to which the telescope will slew
Returns:
0 – Invalid
1 - Valid

:SP<string>#
Set site 4's name to be <string>. LX200s only accept 3 character strings. Other scopes accept up to 15 characters.
Returns:
0 – Invalid
1 - Valid

:SpB<num> <num>#
Set backlash values [Autostar and Autostar II]
Returns: 1 when complete
0 for programming error

: SpH<num><num>#
Set Home Data [Autostar II only]
Returns: 1 when complete
0 for programming error

:SpS<num><num><num>#
Set Sensor Offsets [Autostar II only]
Returns: 1 when complete
0 for programming error

:Sq#
Step the quality of limit used in FIND/BROWSE through its cycle of VP … SU. Current setting can be queried with :Gq#
Returns: Nothing

:SrHH:MM.T#
:SrHH:MM:SS#
Set target object RA to HH:MM.T or HH:MM:SS depending on the current precision setting.

Returns:
0 – Invalid
1 - Valid

:SsNNN#
Set the size of the largest object the FIND/BROWSE command will return to NNNN arc minutes
Returns:
0 – Invalid
1 - Valid

:SSHH:MM:SS#
Sets the local sidereal time to HH:MM:SS
Returns:
0 – Invalid
1 - Valid

:StsDD*MM#
Sets the current site latitude to sDD*MM#
Returns:
0 – Invalid
1 - Valid

:STdddd.dddddd# [Autostar II Only]
Sets the current tracking rate to ddd.dddd hertz, assuming a model where a 60.0000 Hertz synchronous motor will cause the RA axis to make exactly one revolution in 24 hours.
Returns:
0 – Invalid
2 – Valid

:ST+# Increment Manual rate by 0.1 Hz
Returns: Nothing

:ST-# Decrement Manual rate by 0.1 Hz
Returns: Nothing

:STA- [Autostar II only] Enable Altitude SmartDrive (PEC)
Returns:Nothing

:STA+ [Autostar II only] Enable Altitude SmartDrive (PEC)
Returns:Nothing

:STZ- [Autostar II only] Disable RA/Azimuth SmartDrive (PEC)
Returns:Nothing

:STZ+ [Autostar II only] Enable RA/Azimuth SmartDrive (PEC)
Returns:Nothing

:SwN#
Set maximum slew rate to N degrees per second. N is the range (2..8)
Returns:
0 – Invalid
1 - Valid

:SyGPDCO#
Sets the object selection string used by the FIND/BROWSE command.
Returns:
0 – Invalid
1 - Valid

:SzDDD*MM#
Sets the target Object Azimuth [LX 16" and Autostar II only]
Returns:
0 – Invalid
1 - Valid

T – Tracking Commands

:T+# Increment Manual rate by 0.1 Hz
Returns: Nothing

:T-# Decrement Manual rate by 0.1 Hz
Returns: Nothing

:TL# Set Lunar Tracking Rage
Returns: Nothing

:TM# Select custom tracking rate [no-op in Autostar II]
Returns: Nothing

:TQ# Selects sidereal tracking rate
Returns: Nothing

:TS# Select Solar tracking rate. [LS Only]
Returns: Nothing

U - Precision Toggle

:U# Toggle between low/hi precision positions
Low - RA displays and messages HH:MM.T sDD*MM
High - Dec/Az/El displays and messages HH:MM:SS sDD*MM:SS
Returns Nothing

V – PEC Readout

:VDNNNN#
Read out Dec PEC Table Entry [Autostar II and Classic 16" only]
Returns: D.DDDD
Rate Adjustment factor for worm segment NNNN. PecRate = TheoreticalRate * sD.DDD for this segment

:VRNNNN#
Read out RA PEC Table Entry [Autostar II and Classic 16" only]
Returns: D.DDDD
Rate Adjustment factor for worm segment NNNN. PecRate = TheoreticalRate * sD.DDD for this segment

W – Site Select

:W<n>#
Set current site to <n>, an ASCII digit in the range 1..4
Returns: Nothing

? – Help Text Retrieval

:??# Set help text cursor to the start of the first line.
Returns: <string>#
The <string> contains first string of the general handbox help file.

:?+# Retrieve the next line of help text
Returns: <string>#
The <string> contains the next string of general handbox help file

:?-# Retrieve previous line of the handbox help text file.
Returns: <string>#
The <string> contains the next string of general handbox help file

Appendix A: Autostar II Command Extensions

:Aa#	Automatically align scope
:CL#	Sync on Selenographic Coordinates
:CX#	Smart Mount Training Commands
:$BAdd#	Set Altitude/Dec Antibacklash
:$BZdd#	Set Azimuth/RA Antibacklash
:BD<n>#	Programmable Reticule Duty Cycle
:fT#	Query OTA Temperature
:F<n>#	Set Focuer Speed
:FB#	Query Focuser Busy Status
:FPsDDDD#	Pulse Focuser
:FE#	Return Instrument ID
:Fp#	Query Focuser Position
:FL<p>#	Set Focuser Positision
:Fz<n>#	Set zero shift digital focuer Speed
:Fz#:	set zero shift digital speed fastest
:FzP<p>#	Set zero shift digital Focuser Positision
:FzQ#	Stop zero shift digital motion
:FzS#	Set zero shift digital speed slowest
:Fzp#	Query zero shift digital Focuser Position
:g+#	Turn on GPS power
:g-#	Turn off GPS power
:gps#	Stream GPS data
:gT#	Updates Time of Day from GPS
:GE<lat>#	Get Selenographic Latitude
:Ge<lon>#	Get Selenographic Longitude
:GpB#	Get backlash
:GpH#	Get home
:Gm#	Get Meridian Distance
:GpS#	Get Sensor offsets
:GW#	Get Alignment Status
;hC#	Calibrate home position sensors
:hIYYMMDDHHMMSS#	Initialize remotely operated telescope
:I#	Initialize Telescope
:MgnDDDD#	Guide north
:MgsDDDD#	Guide south
:MgeDDDD#	Guide east
:MgwDDDD#	Guide west
:$QS+#	Enables SmartMount
:$QS-#	Disables SmartMount
:$QU+#	Enables SmartMount Update Mode
:$QU-#	Disables SmartMount Update Mode
:$QZ+#	RA PEC Enable
:$QZ-#	RA PEC Disable
:$QA+#	Dec PEC Enable
:$QA-#	Dec PEC Disable
:rn#	Rotate Derotator to North Up
:rh#	Mark North Up on Derotator
:rC#	Slew Derotator
:rc#	Slew Derotator
:RADD.D#	Programmable Slew Rates
:REDD.D#	Programmable Slew Rates
:RgSS.S#	Programmable Guiding Rates
:SBn#	Set Baud Rate
:SE<lat>#	Set Selenographic Latitude
:Se<lon>#	Set Selenographic Longitude
:Sm+#	Enable Smart Mount
:Sn-#	Disable Smart Mount

:SpB<n><n>#	Set backlash
:SpH<n><n>#	Set home
:SpS<n><n><n>#	Set Seneor offsets
:STDDD.DDD#	Set tracking precision rate
:VDNNNN#	Read out Dec PEC Table Entry
:VRNNNN#	Read out RA PEC Table Entry